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IN THE CLAIMS

1. (Previously Presented) A sub-aperture beamforming probe including an array of transducer elements, the probe comprising:

a handheld ultrasound probe housing;

a first processing board comprising a first signal processor located in the probe housing;

a plurality of transducer elements held in the probe housing and coupled to receive signal connections of the first signal processor to define a receive sub-aperture, the receive signal connections coupling receive signals arising from the transducer elements to the first signal processor; and

a cache memory in the probe housing and coupled to the first signal processor, the cache memory comprising directional parameters associated with receive beams for the receive sub-aperture;

where the first signal processor retrieves directional parameters associated with one of the receive beams, determines a beamforming delay derived from the directional parameters for each transducer element in the receive sub-aperture, and applies the respective beamforming delay to each receive signal.

2. (Previously Presented) The beamforming probe of claim 1, where one of the directional parameters is an inclination value.

3. (Previously Presented) The beamforming probe of claim 1, wherein the beamforming delay is implemented as a phase shift.

4. (Previously Presented) The beamforming probe of claim 1, wherein the cache memory comprises static setup information including at least one of locations of the transducer elements

defining the receive sub-aperture and delay setting mapping tables associated with the transducer elements defining the receive sub-aperture.

5. (Previously Presented) The beamforming probe of claim 1, wherein the directional parameters stored in the cache memory comprises dynamic setup information containing directional information for the receive sub-aperture that varies from beam to beam.

6. (Cancelled)

7. (Cancelled)

8. (Previously Presented) The beamforming probe of claim 1, where:

the first signal processor retrieves the directional parameters for first and second receive sub-apertures, determines a beamforming delay derived from the directional parameters for each transducer element in first and second receive sub-apertures, and applies the beamforming delays to the receive signals obtained from the respective transducer element.

9. (Previously Presented) The beamforming probe of claim 1, further comprising a cache memory controller located in the probe housing and coupled to the cache memory, the cache memory controller incrementing an address pointer through pages in the cache memory to read out select pages the directional parameters.

10. (Previously Presented) The beamforming probe of claim 9, further comprising a communication interface coupled to the cache memory controller for interfacing with a system host.

11. (Previously Presented) The beamforming probe of claim 10, where the cache memory controller obtains the directional parameters using the communication interface.

12. (Previously Presented) The beamforming probe of claim 1, further comprising:

a second processing board comprising a second signal processor located in the probe housing;

a plurality of second transducer elements held in the probe housing and coupled to second receive signal connections of the second signal processor to define a second receive sub-aperture, the second receive connections coupling second receive signals arising from the second transducer elements to the second signal processor; and

the cache memory coupled to the second signal processor, the cache memory comprising second directional parameters associated with receive beams for the second receive sub-aperture;

where the second signal processor retrieves the second directional parameters associated with one of the receive beams for the second receive sub-aperture, determines a beamforming delay derived from the second directional parameters for each transducer element in the second receive sub-aperture, and applies the respective beamforming delay to each second receive signal.

13. (Cancelled)

14. (Currently Amended)A sub-aperture beamforming probe comprising:

a handheld ultrasound probe housing;

a first processing board comprising a first signal processor located in the probe housing;

a second processing broad comprising a second signal processor located in the probe housing; and

a plurality of transducer elements held in the probe housing and coupled to the first and second signal processors to define a plurality of receive sub-apertures;

where the transducer elements associated with each receive sub-aperture are coupled to at least one of the first and second signal processors without partitioning any receive sub-aperture between the first and second processors; and

a cache memory located in the probe housing and coupled to the first signal processor, the cache memory comprising directional parameters for a selected receive sub-aperture coupled to the first signal processor.

15. (Previously Presented) The beamforming probe of claim 14, where the first signal processor:

retrieves the directional parameters for the selected receive sub-aperture; and

determines, for a selected transducer element of the selected receive aperture, a beamforming delay derived from the directional parameters.

16. (Previously Presented) The beamforming probe of claim 14, where the first signal processor applies the beamforming delay to a receive signal arising from the selected transducer element on a beam by beam basis.

17. (Previously Presented) The beamforming probe of claim 14, wherein the cache memory is coupled to the second signal processor, the cache memory comprising beam dependent directional parameters for a selected receive sub-aperture coupled to the second signal processor.

18. (Previously Presented) The beamforming probe of claim 14, where the transducer elements associated with at least one of the receive sub-apertures are spatially arranged in a triangular pattern.

19. (Previously Presented) The beamforming probe of claim 14, further comprising a receive sub-aperture output driven by the first signal processor to carry a sub-aperture beamformed receive signal for the selected receive sub-aperture.

20. (Cancelled)

21. (Previously Presented) The beamforming probe of claim 14, further comprising a location memory coupled to the first signal processor, the location memory comprising a spatial location for a selected receive sub-aperture.

22. (Previously Presented) A method for performing sub-aperture beamforming in an ultrasound probe where the probe includes a handheld probe housing that holds a plurality of transducer elements, a first signal processor and cache memory, the method comprising :

coupling, to the first signal processor, receive signals arising from the transducer elements associated with a receive sub-aperture;

retrieving, from the cache memory, a beam related directional parameter for the receive sub-aperture; and

determining a beamforming delay derived from the directional parameter for a selected transducer element associated with the receive sub-aperture.

23. (Previously Presented) The method of claim 22, further comprising applying the beamforming delay, within the probe housing, to a receive signal arising from the selected transducer element.

24. (Previously Presented) The method of claim 22, further comprising applying a plurality of beamforming delays to a plurality of receive signals from the transducer elements associated with the receive sub-aperture.

25. (Previously Presented) The method of claim 22, where coupling comprises coupling receive signals from the transducer elements associated with a plurality of receive sub-apertures to the first signal processor on a first processor board in the probe housing and to a second signal processor on a second processor board in the probe housing;

where no receive sub-aperture is partitioned between the first and second processing boards.

26. (Previously Presented) The method of claim 22, further comprising storing a spatial location in a location memory located in the probe housing.

27. (Previously Presented) The method of claim 22, further comprising receiving the directional parameter from a host system over a system cable.

28. (Cancelled)

29. (Previously Presented) The method of claim 22, further comprising maintaining a link between the cache memory and a host system according to a standard defined by IEEE 1596.

30. (Cancelled)

31. (Previously Presented) The method of claim 22, further comprising :

receiving a plurality of directional parameters for receive sub-apertures coupled to the first processor and a second processor from a host system at a cache memory controller; and

transferring the directional parameters for receive sub-apertures coupled to the first processor to the first processor board and transferring the directional parameters for receive sub-apertures coupled to the second processor to the second processor board.

32. (Previously Presented) The method of claim 22, further comprising inputting to the first signal processor a test signal configured to do at least one of calibrate and verify operation of the first signal processor.

33. (Previously Presented) The method of claim 22, further comprising storing, in memory on the probe, a key containing information validating probe commands.

34. (Previously Presented) The beamforming probe of claim 1, wherein the plurality of transducer elements are arranged spatially in a triangular pattern.

35. (Previously Presented) The beamforming probe of claim 1, wherein the plurality of transducer elements have adjacent rows of elements constituting part of the receive sub-aperture with different first and second numbers of elements in the adjacent rows.

36. (Previously Presented) The beamforming probe of claim 14, wherein at least a portion of the receive sub-apertures comprise different first and second numbers of transducer elements arranged in at least first and second adjacent rows of transducer elements.

37. (Previously Presented) The beamforming probe of claim 1, wherein the cache memory stores directional set up information for all receive beams in a receive scan sequence associated with the receive sub-aperture.

38. (Previously Presented) The beamforming probe of claim 1, wherein the cache memory stores directional information divided into pages, where each of the pages contains directional information associated with a different receive beam of a receive scan sequence.

39. (Previously Presented) The beamforming probe of claim 14, wherein the cache memory stores the directional parameters divided into pages, the first signal processor reading

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one of the pages of the directional parameters at a time in connection with corresponding receive signals.